UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,502	09/01/2006	Yuichiro Nakamura	OGOSH60USA	6549

270 7590 06/03/2009

HOWSON & HOWSON LLP
501 OFFICE CENTER DRIVE
SUITE 210
FORT WASHINGTON, PA 19034

EXAMINER	
SHEVIN, MARK L	

ART UNIT	PAPER NUMBER
1793	

MAIL DATE	DELIVERY MODE
06/03/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/598,502	NAKAMURA ET AL.	
	Examiner	Art Unit	
	MARK L. SHEVIN	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4 and 11-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 4, and 11-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 1, 4, and 11-17, filed March 11th, 2009, are currently under examination. Compared to the claims filed as a preliminary amendment on September 1st, 2006 and examined in the previous Office Action mailed November 12th, 2008, claims 1 and 4 have been amended and claims 13-17 are new.

Status of Previous Rejections

2. The previous rejections of claims 1, 4, 11, and 12 under 35 U.S.C. 112, second paragraph have been withdrawn in view of the amendments to claims 1, 4, 11, and 12.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. **Claim 1** is rejected under 35 U.S.C. 103(a) as being unpatentable over **JP '623** (JP 2002-069623 – Machine translation).

JP '623:

Ueno, drawn to a Co-Cr-Pt-B based sputtering target having a fine and uniform microstructure (Abstract), teaches a Co-Cr-Pt-B target by providing dispersed boride precipitates in a Co-Cr-Pt-B matrix, the coercive force and dispersion of magnetic properties in a film produced by the sputtering target are stabilized and homogenized (para 0013).

The grain size of the target my be made smaller by fasting cooling during casting, for example, by casting a thinner ingot (para 0019). Hot rolling is also preferred to control the microstructure of the cast target (para 0020).

The Co-Cr-Pt-B target is made by casting and hot-rolling with conditions shown in Table 1.

Ueno thus teaches a sputtering target with a composition comprising Co-Cr-Pt-B, which is prepared by melting (casting) and rolling (hot rolling) which contains "other substances without ductility""(boride) but does not teach the volume ratio, Vickers hardness, or average diameter of these precipitates, the Vickers hardness of the matrix phase, nor the presence of defects of 10 microns of more resulting from machine work.

Ueno also does not teach explicitly teach that there are “few surface defects”.

Regarding claims 1 and 13-16 it would have been obvious to one of ordinary skill in sputtering target manufacture, at the time the invention was made, to form a Co-Cr-Pt-B sputtering target with few surface defects prepared by melting and rolling with the claimed microstructure of a ductile matrix and relatively less ductile precipitates as JP '623 teaches the formation of a substantially identical product of a Co-Cr-Pt-B sputtering target by the identical process of casting and rolling and thus one of ordinary skill would have a reasonably expectation of success in producing the same resultant microstructure with the claimed precipitate amount, precipitate size, and Vickers hardness. From MPEP 2112.01: Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or

obviousness has been established. *In re Best,* 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada,* 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

The sputtering target of JP '623 has does not state the presence of surface defects nor the presence of machining work that would produce "defects of 10 μm resulting from machine work" thus the prior art reads on "with few surface defects" and "wherein defects of 10 μm resulting from machine work do not exist."

4. **Claims 4 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over **JP '623** as applied to claim 1 above, in view of **JP '125** (JP 2002-208125 – Machine translation), **Yamakoshi** (US 6,153,315), and **Kano** (US 5,460,793).

The disclosure of JP '623 was discussed in the rejection of claim 1 above, however JP '623 did not teach cutting or polishing the surface of the sputtering target.

JP '125:

JP '125, also drawn to a Co-Cr-Pt-B sputtering target, teaches there is a relationship between the surface roughness of a target and the sputtered film deposited on a substrate (para 0004 – 0007) and that the dispersion in magnetic properties of deposited Co-Cr-Pt type layers could be minimized by reducing the surface roughness of the finishing sputtering target to less than 1.50 microns (para 0009 and 0012).

After casting and rolling, the surface is finished by cutting on a lathe (para 0003) and surface roughness was changed by altering the feed rate of the cutting bit on the lathe (para 0014, 0023, and 0030).

Yamakoshi:

Yamakoshi, drawn to a method of manufacturing a sputtering target which provides excellent uniformity in film thickness and low incidence of occurrence of nodules and particles (col. 1, lines 5-10), teaches that variation in film thickness and the production of particles and nodules are all attributable to conditions of the target surface (col. 1, lines 23-40).

In particular, Yamakoshi determined that the formation of nodules and particles are promoted by residual materials from processing tools such as turning (lathe) tools which remain on the surface due to abrasion of the tools during machining as well as residual abrasives (col. 2, lines 45-55).

In manufacturing a sputtering target, machining, polishing, and chemical etching are generally used to smooth a surface for controlling surface roughness (col. 4, lines 15-20) and that it is necessary to reduce the thickness of a surface damage layer produced by machining to 50 μm or less (col. 4, lines 34-40).

Use a diamond turning tool can reduce the surface roughness effectively to this end without needing further wet polishing or chemical polishing (col. 4, lines 51-58), however conventional polishing methods can be used to further reduce surface roughness and the thickness of a surface damaged layer (col. 4, line 66 - col. 5, line 2).

Kano:

Kano, drawn to the manufacture of metal silicide sputtering targets that give off a minimum of particles (col. 2, lines 20-25), teaches that the formed sputtering targets are machined to final shape and dimension and have a deformed layer removed and the surface smoothed by a number of methods including polishing (col. 7, lines 5-15). 20 μm – 100 μm are removed from the target strain-free and along with microstructure control, was effective in controlling early-stage particle generation (col. 7, lines 16-20 and 24-34).

Regarding claims 4 and 17, it would have been obvious to one of ordinary skill in sputtering target manufacture, at the time the invention was made, to subject the cast (melted) and rolled sputtering target of JP '623 to primary cutting work to remove 1 mm to 10 mm from the surface and then subsequently removing 1 μm to 50 μm by polishing as JP '125 taught that the dispersion in magnetic properties of deposited Co-Cr-Pt type layers could be minimized by reducing the surface roughness of the finishing sputtering target to less than 1.50 microns (para 0009 and 0012) and that after casting and rolling, the surface is finished by cutting on a lathe (para 0003) and surface roughness was changed by altering the feed rate of the cutting bit on the lathe (para 0014, 0023, and 0030). A skilled machinist would be able to adjust the area removed from a rough sputtering target depending on the desired target shape, size, surface profile, and surface roughness. In fact, Kano taught that the formed sputtering targets are machined to final shape and dimension (col. 7, lines 5-15).

As for the subsequent polishing step following machining, Yamakoshi taught that conventional polishing methods can be used to further reduce surface roughness and

the thickness of a surface damaged layer after machining (col. 4, line 66 - col. 5, line 2) while Kano taught a deformed layer was removed and the surface smoothed by a number of methods including polishing (col. 7, lines 5-15) where 20 μm – 100 μm are removed from the target strain-free. This, along with microstructure control, was effective in controlling early-stage particle generation (col. 7, lines 16-20 and 24-34). It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed range of material removed from the target surface through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art (Kano), discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980).

Regarding claim 12, JP '125 made it clear (para 00030 that cutting was performed on a lathe with a cutting tool (para 0003), while Yamakoshi added that machining should be performed with a diamond turning tool (a cutting tool) (col. 4, lines 51-58 and col. 4, line 66 - col. 5, line 2).

5. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over **JP '623** in view of **JP '125, Yamakoshi,** and **Kano**, as applied to claims 1, 4, and 12 above, in further view of **Hatwar** (US 4,895,592).

The disclosures of JP '623, JP ' 125, Yamakoshi, and Kano were discussed above, however none of the references taught that polishing was performed with sandpaper or grindstone having a rough abrasive grit size of #80 to #400.

Hatwar:

Hatwar, drawn to high-purity substantially defect-free sputtering target materials and a method of making them (col. 1, lines 8-12), teaches that the surfaces of the target were polished clean using 240, 320, 400, and 600 grit emery papers (sandpaper) (col. 5, lines 42-51).

Regarding claim 11, it would have been obvious to one of ordinary skill in sputtering target manufacturing, at the time the invention was made, to polishing the sputtering targets of JP '623 processed by the method disclosed in the rejection of claims 1, 4, and 12 above using sandpaper or grindstone with a rough grit of #80 to #400 as Yamakoshi and Kano suggested that the target be polishing after machining to further refine the surface roughness and Hatwar teaches a specific example of a polishing process to clean the surface of the targets with the goal being to produce "defect-free sputtering targets".

Response to Applicant's Arguments:

6. Applicant's arguments filed March 11th, 2009 have been fully considered but they are not persuasive.

Applicants assert (p. 9, para 5 to p. 10, para 3) that the product of JP '623 is not substantially identical to the claimed product as JP '623 does not teach substances without ductility in the form of particles.

In response, JP '623 teaches a Co-Cr-Pt-B sputtering target made by an identical process of casting and rolling and thus one of ordinary skill would have a reasonably expectation of success in producing the same resultant microstructure with the claimed precipitate amount, precipitate size, and Vickers hardness. From MPEP 2112.01:

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best,* 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada,* 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Applicants assert (p. 11, para 2 to para 3) that the sputtering target of JP '623 is subject to machine work and must therefore have defects that are excluded by the instant claims.

In response, JP '623 does not teach the presence of defects due to machine work and Applicants have not introduced scientific evidence to prove that the prior art has such surface defects.

Applicants assert (p. 13, para 1) that JP '125 clearly employs different surface processing than specifically required by the limitation of method claim 4, has a different technical concept, and is not concerned with controlling anything other than surface roughness.

In response, the Examiner considers cutting with a lathe to read on the claimed step of "...primary processing of cutting work by cutting a thickness of 1 mm to 10 mm from said target surface" and the technical concept of the invention is relevant to the instant claims in that it is concerned with the surface features of sputtering targets as a result effective variable in the dispersion of magnetic properties for Co-Cr-Pt-B targets.

Applicants assert (p. 13, para 2) that Yamakoshi and Kano fail to disclose anything relative to a mixed phase material of a ductile material and a non-ductile material.

In response, these references minimize particle generation by minimizing damage to the surface layers of their respective sputtering targets and such methods of machining and polishing the sputtering targets of Yamakoshi and Kano do not appear to be limited to single phase titanium or single phase silicide targets, but rather metal sputtering targets in general.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

-- Claims 1, 4, and 11-17 are finally rejected
-- No claims are allowed

The rejections above rely on the references for all the teachings expressed in the texts of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required,

applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588 and fax number is (571) 270-4588. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy M. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Mark L. Shevin/
Examiner, Art Unit 1793
/Roy King/
Supervisory Patent Examiner, Art Unit 1793
May 30th, 2009
10-598,502